Claim Amendment

Please amend the claims to read as indicated in the following list of claims:

1. (Original) An optical top-hat pulse generator comprising:
   a polarization-maintaining coupler having a first side with a first arm and a second arm and a second side having a third arm and a fourth arm, the first arm adapted to receive a continuous wave optical signal and to launch the continuous wave optical signal into the arms on the second side;
   a polarization-maintaining fiber having a first end and a second end, the first end coupled to the third arm of the polarization-maintaining coupler and the second end coupled to the fourth arm;
   an optical filter coupled to the second arm of the first polarization-maintaining coupler; and
   a control pulse coupler positioned to launch optical energy into the polarization-maintaining fiber, the control pulse coupler having an input adapted to receive an optical control pulse.

2. (Original) The optical top-hat pulse generator of claim 1 wherein the polarization-maintaining optical fiber has a first principal axis and a second principal axis and wherein the continuous wave optical signal is linearly polarized and is launched into the polarization-maintaining fiber such that the polarization of the continuous wave optical signal is

aligned with the first principal axis and wherein the optical control pulse is linearly polarized and is launched into the polarization fiber such that the polarization of the optical control pulse is aligned with the second principal axis.

3. (Currently amended) The optical top-hat pulse generator of claim 2 wherein said polarization-maintaining optical fiber ~~loop~~ comprises two or more sections of polarization-maintaining fiber coupled together, wherein ~~the~~ a first principal axis of one section is aligned to ~~the~~ a second principal axis of an adjacent section.

4. (Original) The optical top-hat pulse generator of claim 1 further comprising a power control device coupled to said control pulse coupler, said power control device controlling the power of optical control pulse.

5. (Original) The optical top-hat pulse generator of Claim 4 wherein said power control device is a fiber amplifier or an attenuator.

6. (Original) The optical top-hat pulse generator of Claim 1 further comprising a polarizer disposed at the second arm or at an output of the optical filter.

7. (Original) The optical top-hat pulse generator of Claim 1 wherein the optical filter is a bandpass filter, a stop band filter or an edge filter.

8. (Original) The optical top-hat pulse generator of Claim 1 wherein the first polarization-maintaining coupler is an adjustable coupler and a coupling ratio of the polarization-maintaining coupler is adjusted to minimize an output signal at the second arm when no optical control pulse is launched into the optical coupler.

9. (Original) The optical top-hat pulse generator of Claim 1 wherein the intensity of the optical control pulse is controlled to that of a fundamental soliton of the polarization-maintaining fiber.

10. (Original) The optical top hat generator of Claim 3, wherein the two or more sections of polarization-maintaining fiber are spliced together.

11. (Original) The optical top-hat pulse generator of Claim 1 wherein the polarization-maintaining fiber has a zero dispersion wavelength and the continuous wave optical signal is launched into the polarization-maintaining fiber at the zero dispersion wavelength.

12. (Original) A method for optical top-hat pulse generation comprising:

launching a linearly-polarized continuous wave optical signal along a first principal axis of a polarization-maintaining optical fiber loop;

launching a linearly-polarized optical control pulse along a second principal axis of the polarization-maintaining optical fiber loop;

controlling an intensity of the optical control pulse; and

coupling an optical signal from the polarization-maintaining fiber loop to a polarizer to produce a top-hat optical pulse signal.

13. (Original) The method of Claim 12 further comprising filtering the top-hat optical pulse signal.

14. (Original) The method of Claim 12 wherein said polarization-maintaining optical fiber loop comprises two or more sections of polarization-maintaining optical fiber coupled together, wherein a first principal axis of one section is aligned to a second principal axis of an adjacent section.

15. (Original) The method of Claim 12 further comprising the step of controlling a power associated with said control pulse.

16. (Original) The method of Claim 15 wherein the power of the control pulse is controlled to that of a fundamental soliton of the polarization-maintaining optical fiber loop.

17. (Original) The method of Claim 12 wherein the linearly-polarized continuous wave optical signal is launched into the polarization-maintaining optical fiber loop using an adjustable polarization-maintaining coupler and a coupling ratio of the polarization-maintaining coupler is adjusted to minimize an output from the

polarization-maintaining coupler in the absence of the linearly-polarized optical control pulse.

18. (Original) The method of Claim 12 wherein the polarization-maintaining optical fiber loop has a zero dispersion wavelength and the continuous wave optical signal is launched into the polarization-maintaining optical fiber loop at the zero dispersion wavelength.

19. (Original) The method of Claim 14 wherein the two or more sections of polarization-maintaining optical fiber are spliced together.

20. (Original) An apparatus for detecting a pulse position modulated optical signal comprising:

a clock source providing a pulsed optical clock signal synchronized to said pulse position modulated optical signal;

a continuous wave optical source producing a continuous wave optical signal;

a first non-linear optical loop mirror receiving said continuous wave optical signal and said pulse position modulated signal and producing a first optical top-hat output signal, wherein said first non-linear optical loop mirror comprises a polarization-maintaining fiber loop;

a second non-linear optical loop mirror receiving said continuous wave optical signal and said pulsed optical clock signal and producing a second optical top-hat output signal, wherein said

second non-linear optical loop mirror comprises a polarization-maintaining fiber loop; and

an overlap-to-electric converter receiving said first optical top-hat signal and said second optical top-hat signal and producing an electric signal proportional to an overlap amount between said first optical top-hat signal and said second optical top-hat signal.

21. (Original) The apparatus according to claim 20, wherein said overlap-to-electric converter comprises a coherent correlator, a sum frequency generator, or a four-wave mixer.

22. (Original) The apparatus of claim 20 wherein the polarization-maintaining fiber loop of the first non-linear optical loop mirror and/or the second non-linear optical loop mirror has a first principal axis and a second principal axis, and the continuous wave signal is polarized and launched into the polarization-maintaining fiber loop so that the polarization of the continuous wave signal is aligned with the first principal axis.

23. (Original) The apparatus of claim 22 wherein said polarization-maintaining fiber loop comprises two or more sections of polarization-maintaining fiber coupled together, wherein said first principal axis of one section is aligned to the second principal axis of an adjacent section.

24. (Original) A method for detecting a pulse position modulated optical signal comprising:

receiving said pulse position modulated optical signal and polarizing said pulse position modulated optical signal to provide a linearly polarized pulse position modulated optical signal;

providing a stream of optical clock pulses, wherein said optical clock pulses are linearly polarized;

generating a first linearly polarized continuous wave optical signal having an optical wavelength different than an optical wavelength of the linearly polarized pulse position modulated signal and the polarization of the first linearly polarized continuous wave optical signal being orthogonal to the polarization of the linearly polarized pulse position modulated optical signal;

launching the first linearly polarized continuous wave optical signal into a first non-linear optical loop mirror, the first non-linear optical loop mirror comprising a polarization-maintaining fiber loop having a first principal axis and a second principal axis and the linearly polarized continuous wave optical signal being launched into the polarization-maintaining fiber loop such that the polarization of the linearly polarized continuous wave optical signal is aligned with the first principal axis;

coupling the linearly polarized pulse position modulated optical signal into the first non-linear optical loop mirror such that the

polarization of the linearly polarized pulse position modulated optical signal is aligned with the second principal axis of the polarization-maintaining fiber loop of the first non-linear optical loop mirror;

generating a second linearly polarized continuous wave optical signal having an optical wavelength different than an optical wavelength of the optical clock pulses and the polarization of the second linearly polarized continuous wave optical signal being orthogonal to the polarization of the optical clock pulses;

launching the second linearly polarized continuous wave optical signal into a second non-linear optical loop mirror, the second non-linear optical loop mirror comprising a polarization-maintaining fiber loop having a first principal axis and a second principal axis and the second linearly polarized continuous wave optical signal being launched into the polarization-maintaining fiber loop such that the polarization of the second linearly polarized continuous wave optical signal is aligned with the first principal axis of the polarization-maintaining fiber loop of the second non-linear optical loop mirror;

coupling the optical clock pulses into the second non-linear optical loop mirror such that the polarization of the optical clock pulses is aligned with the second principal axis of the polarization-maintaining fiber loop of the second non-linear optical loop mirror;

coupling a first output optical signal out of the first non-linear optical loop mirror;

filtering said first output signal with a filter that transmits around said optical wavelength of the first linearly polarized continuous wave optical signal and rejects around the optical wavelength of the linearly polarized pulse position modulated optical signal a first top-hat signal;

coupling a second output optical signal out of the second non-linear optical loop mirror;

filtering said second output signal with a filter that transmits around said optical wavelength of the second linearly polarized continuous wave optical signal and rejects around the optical wavelength of the optical clock pulses to produce a second top-hat signal;

detecting the amount of overlap between the first top-hat signal and the second top-hat signal; and

producing an electrical signal proportional to the amount of overlap.

25. (Original) The method of claim 24 wherein the polarization-maintaining fiber loop of the first non-linear optical loop mirror and/or the second non-linear optical loop mirror comprises two or more sections of polarization-maintaining fiber spliced together, and wherein said first principal axis of one section is aligned to the second principal axis of an adjacent section.

26. (Original) The method of Claim 24 wherein the first linearly polarized continuous wave signal and the second linearly polarized continuous wave signal are generated from one master continuous wave signal.